

(b) (7)(E)

(b) (7)(E)

(b) (7)(E)

(b) (7)(E)

(b) (7)(E)

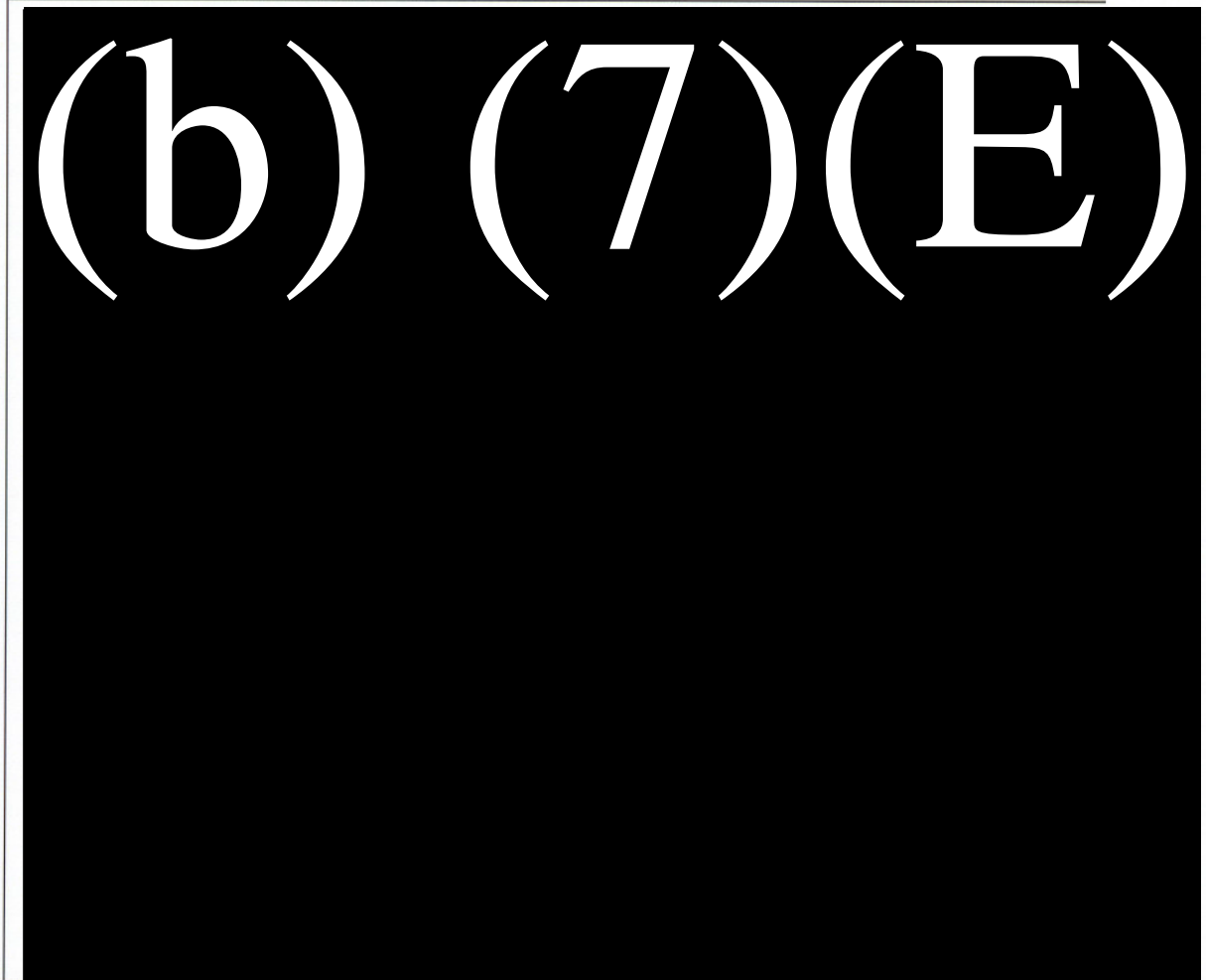
(b) (7)(E)

(b) (7)(E)

(b) (7)(E)

Estimated Cost Comparison of Different Fence/Barriers

9 Fence Lab Candidates Tested/Evaluated	Cost/Mile
(b) (7)(E)	
Currently Deployed Fences within CBP	
(b) (7)(E)	
Additional Fence Lab Candidates Not Tested/Evaluated	
(b) (7)(E)	



Notes:

Costs are based on supplier estimates provided in March 2007, except for (b) (7)(E) which are based on 2006 Baker's Engineering Cost Estimates which use historical data. Actual costs for deployment may vary (increase) and can be impacted by soil, terrain, clearing & grubbing, access roads, and travel distance of materials, equipment, and personnel.

(b) (7)(E)

***Maintenance/Reparability Analysis
for Each Fence Lab Design***

(as of 5/16/07)

(b) (7)(E) Maintenance/Reparability Analysis (5/16/07)

Both natural and manmade forces create fence damage.

Natural Forces (i.e., forces of nature that act upon the fence)

- Corrosion (Above Grade and Below Grade)
- Erosion
- Water Pooling
- Sand Drifts
- Wind Load
- Temperature Change (Thermal Expansion/Contraction)
- Ground Shift

Corrosion is the susceptibility of a given fence to oxidize. This is generally a property of the materials used in the construction of the fence and the hostility of the natural environment in which it is placed.

Erosion describes the susceptibility of the fence to being damaged by water flowing around or underneath it.

Water pooling is the susceptibility of a fence to block water flow causing pooling. In general, a solid barrier presented at or near grade creates a greater likelihood for pooling.

Sand drifting is the propensity of the fence structure to obstruct airborne sand flow so that sand drifts will form against the fencing. This in effect creates a natural bridge. The more solid surface the fence presents to the wind the greater this effect.

Wind load is how much force is applied to the fencing by moving air. This is a function of the height of the fence and the amount of solid surface presented to the wind.

Temperature change susceptibility describes the likelihood that a fence structure will be adversely affected by the heating and cooling cycles that occur naturally. The Southwest border region has an annual temperature range of over 100 degrees Fahrenheit. Fencing will be more affected by this where they have very long structural members and where the local temperature change occurs over a short period of time.

Ground Shift describes the susceptibility of a fence to damage due to the earth shifting. This is a function of the fence structures strength and flexibility.

Manmade Forces (i.e., breaching attempts, vandalism, etc.)

These are the same susceptibilities as described in the Vulnerabilities/Defeat ability section. For the purpose of evaluating susceptibility, manmade actions have been broken down into vehicular and pedestrian susceptibilities. Cutting a fence for a vehicle to pass through creates much more repair work than cutting for a person to pass through, so they are evaluated separately. In addition, some vehicle and pedestrian combinations do not make sense so they are scored as "N/A" (e.g., a vehicle cannot "climb" a fence, a pedestrian cannot "bridge" a fence, etc.)

Task: Evaluate each fence type with regard to damage susceptibility and time-to-repair.

Rating Scheme

– Susceptibility

- Green: Not a Concern
- Yellow: Minimal-to-Moderate Concern
- Red: Moderate-to-Major Concern
- White: Not Applicable

– Time-to-Repair (T_r)

- Green: (b) (7)(E)
- Yellow: (b) (7)(E)
- Red: (b) (7)(E)
- White: (b) (7)(E)

Assumptions

- All natural forces are worst case (e.g., most corrosive soil, worst debris situation for damming, significant daily temperature change, etc.)
- Time-to-repair does not take into account travel time to repair site, time to order materials/consumables, administrative time, etc.

(b) (7)(E)

- For damage that is not localized, time-to-repair is per section of fence (a “section” is defined as “construction joint to construction joint”)
- Sufficient/substantial equipment is available to make necessary repairs (welding equipment, backhoe, dump truck, etc.)

Natural Forces, Susceptibility

Susceptibility	Corrosion		Erosion	Water Pooling	Sand Drifts	Wind Load	Temp Change	Ground Shift
	Above Grade	Below Grade						
<div>(b) (7)(E)</div> <div>(b) (7)(E)</div>								

Natural Forces, Time-to-Repair

	Corrosion		Erosion	Water Pooling	Sand Drifts	Wind Load	Temp Change	Ground Shift
T _r	Above Grade	Below Grade						

(b) (7)(E)

(b) (7)(E)

Manmade Forces, Pedestrian, Time-to-Repair

T_r	Climb	Pry/ Twist	Dis- Assemble	Cut	Dig Under	Ram	Bridge	Pull Down	Cryo	Heat/ Burn
(b) (7)(E)	(b) (7)(E)									

Manmade Forces, Vehicle, Time-to –Repair

T _r	Climb	Pry/ Twist	Dis- Assemble	Cut	Dig Under	Ram	Bridge	Pull Down	Cryo	Heat/ Burn
(b) (7)(E)		(b) (7)(E)								

Summary Data Sheets
9 Fence Lab Designs

SUMMARY DATA SHEET

(b) (7)(E)

Fence Type:	(b) (7)(E)
Fence Material:	
Fence Height:	
Deployment Cost (\$/mile):	(b) (7)(E)
Deployment Capability:	(b) (7)(E)
Proprietary Fee:	
Crew Size (#/mile):	
Crew Size to Maintain	
Passed Crash Test (Disabled vehicle of (b) (7)(E)	
Ideal Terrain:	
Worst Terrain:	
Special Equipment Needs:	
Concrete Required:	
Climbing:	
Tunneling:	
Cutting:	
Visibility (ability to see through):	
Brief Description:	
Other Options:	

(b) (7)(E)

SUMMARY DATA SHEET -**(b) (7)(E)**

Fence Type:	(b) (7)(E)	(b) (7)(E)
Fence Material:	(b) (7)(E)	(b) (7)(E)
Fence Height:	(b) (7)(E)	(b) (7)(E)
Deployment Cost (\$/mile):	(b) (7)(E)	(b) (7)(E)
Deployment Capability:	(b) (7)(E)	(b) (7)(E)
Proprietary Fee:	(b) (7)(E)	(b) (7)(E)
Crew Size (#/mile):	(b) (7)(E)	(b) (7)(E)
Crew Size to Maintain:	(b) (7)(E)	(b) (7)(E)
Passed Crash Test (Disabled vehicle of (b) (7)(E))	(b) (7)(E)	(b) (7)(E)
Ideal Terrain:	(b) (7)(E)	(b) (7)(E)
Worst Terrain:	(b) (7)(E)	(b) (7)(E)
Special Equipment Needs:	(b) (7)(E)	(b) (7)(E)
Concrete Required:	(b) (7)(E)	(b) (7)(E)
Climbing:	(b) (7)(E)	(b) (7)(E)
Tunneling:	(b) (7)(E)	(b) (7)(E)
Cutting:	(b) (7)(E)	(b) (7)(E)
Visibility (ability to see through):	(b) (7)(E)	(b) (7)(E)
Other Options:	(b) (7)(E)	(b) (7)(E)

SUMMARY DATA SHEET - (b) (7)(E)

Fence Type:	(b) (7)(E)
Fence Material:	
Fence Height:	
Fence Width:	
Deployment Cost (\$/mile):	(b) (7)(E)
Deployment Capability:	(b) (7)(E)
Proprietary Fee:	
Crew Size (#/mile):	
Crew Size to Maintain:	
Passed Crash Test (Disabled vehicle of (b) (7)(E)	
Ideal Terrain:	
Worst Terrain:	
Special Equipment Needs:	
Concrete Required:	
Climbing:	
Tunneling:	
Cutting:	
Visibility (ability to see through):	
Other Options:	

(b) (7)(E)

SUMARY DATA SHEET -**(b) (7)(E)**

Fence Type:	(b) (7)(E)
Fence Material:	
Fence Height:	
Deployment Cost (\$/mile):	(b) (7)(E)
Deployment Capability:	(b) (7)(E)
Proprietary Fee:	
Crew Size (#/mile):	
Crew Size to Maintain:	
Passed Crash Test (Disabled vehicle of	
Ideal Terrain:	
Worst Terrain:	
Special Equipment Needs:	
Concrete Required:	
Climbing:	
Tunneling:	
Cutting:	
Visibility (ability to see through):	
Other Options:	

(b) (7)(E)

SUMMARY DATA SHEET -

(b) (7)(E)

Fence Type:	(b) (7)(E)
Fence Material:	
Fence Height:	
Fence Width:	
Deployment Cost (\$/mile):	(b) (7)(E)
Deployment Capability:	(b) (7)(E)
Proprietary Fee:	
Fence Material:	
Crew Size (#/mile):	
Crew Size to Maintain:	
Passed Crash Test (Disabled vehicle of (b) (7)(E))	
Ideal Terrain:	
Worst Terrain:	
Special Equipment Needs:	
Concrete Required:	
Climbing:	
Tunneling:	
Cutting:	
Visibility (ability to see through):	
Other Options:	

(b) (7)(E)